

REMARKSIN THE CLAIMS

The following claims are amended to better describe the Applicants' invention.

In Claim 1:

In line 8 of the claim, AFTER the words "a means for" and BEFORE the word "maintaining" the words -- establishing and --;

in line 8 of the claim, AFTER the words "capillary pressure gradient" and BEFORE the words "substantially independent" in line 9 of the claim, the words -- in a direction from said first end to said second end -- are ADDED;

and in line 9 of the claim, AFTER the words "said liquid phase in" and BEFORE the words "said one or more channels" the words -- each of -- are ADDED. The changes are made in order to clarify that a capillary pressure gradient is established along the length of each of the device channels.

Support is found throughout the specification but is first noted in the last two sentences of paragraph [0036].

In Claim 21:

In line 6 of the claim, the word -- and -- is ADDED following the semicolon ending the clause.

In line 9 of the claim, AFTER the words and comma "said liquid phase," and BEFORE the words "said capillary" the word -- wherein -- is ADDED for syntax;

in line 10 of the claim, AFTER the words "pressure difference", the word "establishing" is DELETED and REPLACED with the words -- establishes and maintains --; AFTER the words "said liquid phase" and BEFORE the semicolon ending the clause the words - - in a direction from said first end to said second end - - are ADDED; and the semicolon and word "and" ending

the clause, the carriage return beginning a new clause, and the first words of line 11 of the claim “maintaining said pressure gradient” are DELETED for syntax.

Support is again found throughout the specification but is first noted in the last two sentences of paragraph [0036].

Applicants assert that No New Matter has been introduced as the result of the foregoing amendments.

REJECTION UNDER 35 U.S.C. §102

***Examiner's §1 – 2***

Examiner has rejected Claims 1, 21, and 22 under 35 U.S.C. §102 as being anticipated by Mundinger, et al., (U.S. Patent Serial Number 5,453,641) in that

*“Mundinger, et al., disclose a cooling device comprising all of the applicant's claimed and disclosed limitations of the instant invention.”*

***Applicants' Response***

Applicants thank the Examiner for his remarks but respectfully disagree with his conclusions.

Regarding Claims 1 and 21, the Examiner broadly states that all the claimed limitations of the instant invention are disclosed by Mundinger ('641). However, Applicants respectfully note that while Mundinger, et al., ('641) refer to a “...*capillary pressure difference*...” across a meniscus (or menisci), nowhere do Mundinger, et al., ('641) either expressly or inherently disclose:

“a means for establishing and maintaining a gradient in said capillary pressure difference in a direction from said first end to said second end substantially independent of the depth of said liquid phase in each of said one or more channels...”

as do amended Claims 1 and 21. That is, Mundinger, et al., ('641) do not recite any structure for generating a capillary pressure gradient along the length of a channel that is independent of the depth of said liquid phase. Mundinger, et al., ('641) instead suggests that “capillary action” (also referred to as “capillary pressure”) is sufficient to induce coolant flow along the length of a microchannel (col. 5, lines 46 – 48) and that the necessary pressure gradient for flow is generated by surface tension (col.5, lines 52 – 55 and lines 64 – 66). Nowhere do Mundinger, et al., ('641) disclose creating a structure that creates a gradient in the capillary difference along the length of these same channels that is *independent* of the depth of the liquid coolant contained within those channels.

By way of contrast, Applicants, have clearly shown that capillary pressure gradients that are independent of the depth of the coolant liquid phase can be created by changing the structure to the containing channel such that the radius of curvature of the coolant contained within the channel changes from point-to-point along the length of the channel (see paragraphs [0043] – [0046]). In particular, Applicants have shown that, in the case of rectangular channels, while some flow is possible as long as the meniscus of the contained liquid coolant is attached at the outside edge of the containing channel, as soon as the coolant begins to recede into the channel due to evaporation the radius of curvature of the meniscus becomes fixed and the flow gradient vanishes. Moreover, where channels having a triangular cross section are used, a means for maintaining the flow gradient is provided (due to the changing radius of curvature of the meniscus as it recedes). However, this structure operates by changing the depth of the coolant liquid which is contrary to that which the Applicants recite and claim.

As such the Applicants respectfully assert that the claimed structure recited in Claims 1 and 21 are not found in Mundinger, et al., ('641) and, therefore, cannot be anticipated by this patent. Moreover, because Claim 22 depends from Claim 21 and merely narrows the scope of a claim now shown not to be anticipated by the prior art Claim 22 must also not anticipate the prior art. Applicants therefore, respectfully request that the Examiner reconsider and withdraw his rejection/objections and pass the amended claim to allowance.

REJECTION UNDER 35 U.S.C. §103(a)

***Examiner's §4(-) 9***

- I. Examiner has rejected Claims 2, 3, 6, 7, 23, 24, and 27 under 35 U.S.C. 103(a), as being unpatentable over Mundinger, et al., (U.S. Patent Serial Number 5,453,641) in view of Nelson et al., (U.S. 4,953,634).
- II. Examiner has rejected Claims 8, 9, 29, and 30 under 35 U.S.C. 103(a), as being unpatentable over Mundinger, et al., (U.S. Patent Serial Number 5,453,641) in view of Nelson et al., (U.S. 4,953,634) as applied to the above claims, and further in view of Frey, et al., (U.S. 5,978,220).

**III.** Examiner has rejected Claims 13, 16, 34, and 37 under 35 U.S.C. 103(a), as being unpatentable over Mundinger, et al., (U.S. Patent Serial Number 5,453,641) in view of Nelson et al., (U.S. 4,953,634) as applied to the above claims, and further in view of Pease, et al., (U.S. 4,567,505).

### ***Applicants' Response***

Applicants again thank the Examiner for his remarks but again respectfully disagree with his conclusion.

Applicants note that each of Claims 2, 3, 6 – 9, 13, 16, 23, 24, 27, 29, 30, 34, and 37 ultimately depends from either of amended Claims 1 or 21. Because each of Claims 2, 3, 6 – 9, 13, 16, 23, 24, 27, 29, 30, 34, and 37, by definition, include all of the limitations of the claims from which they depend, and because the base Claims 1 and 21 have been shown recite limitations which are not recited by Mundinger, et al., ('641), it is not possible to establish *prima facie* obviousness in Claims 2, 3, 6 – 9, 13, 16, 23, 24, 27, 29, 30, 34, and 37 in view of any proposed prior art reference combinations because Mundinger, et al., ('641) has been shown to be deficient. Therefore, all cannot be found in any of the proposed reference combinations as applied against Claims 2, 3, 6 – 9, 13, 16, 23, 24, 27, 29, 30, 34, and 37 and as such the argument for *prima facie* obviousness the standard required by MPEP §2143.

Consequently Applicants assert, that they have overcome the rejection under 35 U.S.C. §103(a) with respect to regarding Claims 2, 3, 6 - 9, 13, 16, 23, 24, 27, 29, 30, 34, and 37 in that by amending Claims 1 and 21, they now recite a structure which is not disclosed or suggested by the prior art in that not all of the limitations of these claims are found in cited references. Applicants, therefore, respectfully request that the Examiner reconsider and withdraw his rejection of Claims 2, 3, 6 - 9, 13, 16, 23, 24, 27, 29, 30, 34, and 37 and pass these claims to allowance.

### **ALLOWABLE SUBJECT MATTER**

#### ***Examiner's §3***

Examiner has noted that Claims 4, 5, 10-12, 14, 15, 17-19, 25, 26, 28, 31-33, 35, 36, and 38-40 are objected to as being dependent upon a rejected base claim, but would be allowable if

rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Applicants' Response***

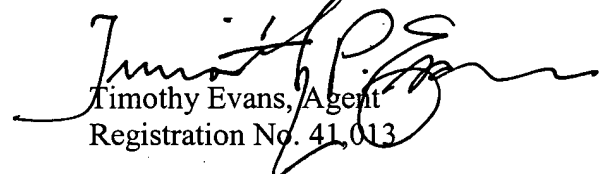
Applicants thank the Examiner for his allowance of Claims 4, 5, 10-12, 14, 15, 17-19, 25, 26, 28, 31-33, 35, 36, and 38-40. However, by amended their Claims 1 and 21 believe that they have overcome the rejections under §102(b) and §103(a) and have therefore obviated the need for amending Claims 4, 5, 10-12, 14, 15, 17-19, 25, 26, 28, 31-33, 35, 36, and 38-40.

**CONCLUSION**

Applicants respectfully assert that by amending Claims 1, and 21 the instant invention now claims a unique device and method that is neither anticipated, suggested nor taught by the prior art. Applicants, therefore, respectfully request reconsideration of the claims now presented. Allowance of this application is earnestly solicited.

This response is:

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**CERTIFICATION UNDER 37 CFR 1.8**

I hereby certify that this New Application Transmittal and the documents referred to as enclosed therein are being deposited with the U. S. Postal Service on **DECEMBER 6, 2004**, as FIRST CLASS mail addressed to: Mail Stop Non Fee Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450

Date of Deposit: 12-06-04

Liz Martinez  
Person Making Deposit  
Liz Martinez  
Signature